
CURRICULUM VITAE

NAME	POSITION TITLE		
Rockne, Russell rockne@u.washington.edu	University of Washington Department of Pathology Research Scientist III		
EDUCATION/TRAINING			
INSTITUTION AND LOCATION	DEGREE	YEAR(s)	FIELD OF STUDY
University of Colorado, Boulder, CO	BS	2002	Mathematics
University of Washington, Seattle, WA	MS	2006	Mathematical Biology
University of Washington, Seattle, WA	PhD	In progress	Mathematical Biology

Professional Experience:

2006-present Research Scientist, Pathology & Applied Mathematics, University of Washington, Seattle, WA
2002-2004 Mathematics Instructor, Edmonds Community College, Mercer Island private high school, WA

Memberships:

European Society for Theoretical and Mathematical Biology (ESTMB)
Society of Mathematical Biology (SMB)
Society of Industrial and Applied Mathematics (SIAM)
Society for Neuro-Oncology (SNO)
American Mathematical Society (AMS)

Awards:

Clinical research paper of the year 2009
K. R. Swanson, G. Chakraborty, C. H. Wang, **R. Rockne**, H. L. P. Harpold, M. Muzi, T. C. H. Anderson, K. A. Krohn, A. M. Spence: Complimentary but Distinct Roles for MRI and 18F-Fluoromisonidazole PET in the Assessment of Human Glioblastomas. *Journal of Nuclear Medicine*, **50**: 36-44 2009.
Pubmed ID: 19091885

Robert's prize nominee and
Top 10 paper of the year for Physics in Medicine and Biology 2011
Rockne, R, Rockhill JK, Mrugala M, Spence AM, Kalet I, Hendrickson K, Lai A, Cloughsey T, Alvord EC Jr., Swanson KR: Predicting the efficacy of radiotherapy in individual glioblastoma patients *in vivo*: a mathematical modeling approach. *Physics in Medicine and Biology*, **55**: 3271-3285 2010.
Pubmed ID: 20484781

Selected peer-reviewed publications

Articles - Peer Reviewed

1. **Rockne R**, Alvord EC Jr., Rockhill J K, Swanson K R: A mathematical model for brain tumor response to radiation therapy. *Journal of Mathematical Biology*, Special Issue on Computational Oncology, 2009 **58**(4-5):561-78 Pubmed ID: 18815786
2. **Rockne R**, Alvord E C Jr., Reed P, Swanson K R: Modeling the growth and invasion of gliomas, from simple to complex: the Goldie Locks paradigm. BIOMAT 2007 International Symposium on Mathematical and Computational Biology. Ed. Mondaini R. 2008 World Scientific
3. Swanson K R, Harpold H L P, Peacock D L, **Rockne R**, Pennington C, Kilbride L, Grant R, Wardlaw J, Alvord E C, Jr. Velocity of Radial Expansion of Contrast-Enhancing Gliomas and Effectiveness of

Radiotherapy in Individual Patients: A Proof of Principle. *Clinical Oncology*, 2008 20: 301-308 Pubmed ID: 18308523

4. Swanson KR, Chakraborty G, Wang CH, **Rockne R**, Harpold HLP, Muzi M, Anderson TCH, Krohn KA, Spence AM: Complimentary but Distinct Roles for MRI and 18F-Fluoromisonidazole PET in the Assessment of Human Glioblastomas. *Journal of Nuclear Medicine*, 2009 **50**: 36-44. Pubmed ID: 19091885
5. Szeto MD, Chakraborty G, Hadley J, **Rockne R**, Muzi M, Alvord E C Jr., Krohn K, Spence A M, Swanson K R: Quantitative Metrics of Net Proliferation and Invasion Link Biological Aggressiveness Assessed by MRI with Hypoxia Assessed by FMISO-PET in Newly Diagnosed Glioblastomas. *Cancer Research*, 2009 **69**(10):4502-9 Pubmed ID: 19934335
6. Wang C, Rockhill JK, Mrugala M, Peacock DL, Lai A, Jusenius K, Wardlaw JM, Cloughesy T, Spence AM, **Rockne R**, Alvord EC Jr., Swanson KR: Prognostic significance of growth kinetics in newly diagnosed glioblastomas revealed by combining serial imaging with a novel bio-mathematical model. *Cancer Research*, 2009 **69**(23): 9133-9140 Pubmed ID: 19366800
7. Assefa M, **Rockne R**, Szeto M, Swanson KR. Mathematical Modeling of Glioma Proliferation and Diffusion. *Ethnicity and Disease*, 2009 **19**:2, Supplement 3 Pubmed ID: 19554787
8. Swanson KR, Chakraborty G, Wang CH, **Rockne R**, Harpold HLP, Muzi M, Anderson TCH, Krohn KA, Spence AM: Complimentary but Distinct Roles for MRI and 18F-Fluoromisonidazole PET in the Assessment of Human Glioblastomas. *Journal of Nuclear Medicine*, 2009 **50**: 36-44. Pubmed ID: 19091885
9. **Rockne R**, Rockhill JK, Mrugala M, Spence AM, Kalet I, Hendrickson K, Lai A, Cloughsey T, Alvord EC Jr, Swanson KR: Predicting the efficacy of radiotherapy in individual glioblastoma patients *in vivo*: a mathematical modeling approach. *Physics in Medicine and Biology*, 2010 **55**: 3271-3285. Pubmed ID: 20484781
10. Basanta D, Scott JG, **Rockne R**, Swanson KR, Anderson ARA: The role of IDH1 mutated tumor cells in secondary glioblastomas: an evolutionary game theoretical view. *Physical Biology*. **8**(2011) 015016
11. Bohman LE, Swanson KR, Moore JL, **Rockne R**, Mandigo C, Hankinson T, Assanah M, Canoll P, Bruce JN. Preoperative MRI Characteristics of Glioblastoma Multiforme: Implications for Understanding Glioma Ontogeny. *Neurosurgery*, 67(5):1319-27, 2010 Pubmed ID: 20871424
12. Gu S, Chakraborty G, Champley K, Alessio A, Claridge J, **Rockne R**, Muzi M, Krohn K, Spence AM, Alvord E C Jr., Anderson ARA, Kinahan P, Swanson KR. Applying a patient-specific bio-mathematical model of glioma growth to develop virtual [18F]-FMISO PET images. In: Computation modeling in cancer special double issue: IMA Mathematical Medicine and Biology. Ed. Rejniak K, Anderson ARA. *Accepted for publication*.
13. Baldock A, **Rockne R**, Boone A, Neal M, Mrugala M M, Rockhill J K, Swanson K R. Patient-specific mathematical neuro-oncology: Predicting prognosis and treatment response in individual glioblastoma patients. *Expert Reviews in Neurotherapeutics*. *Submitted*

Contributed Works

Rockne R, Alvord EC Jr., Szeto M, Gu S, Chakraborty G, Swanson KR: Modeling Diffusely Invading Brain Tumors: An Individualized Approach to Quantifying Glioma Evolution and Response to Therapy. In: Selected Topics in Cancer Modeling: Genesis, Evolution, Immune Competition, and Therapy. Ed. Bellomo N, Chaplain M, de Angelis E. Birkhauser, Boston MA. 2008 ISBN-13 13 978-0817647124

Chakraborty G, Sodt R, Massey S, Gu S, **Rockne R**, Ellsworth A C Jr., Swanson KR. Bridging from Multi-scale Modeling to Practical Clinical Applications in the Study of Human Gliomas. In: Multiscale Cancer Modeling. Ed. Deisboeck T, Stamatakis G. CRC Press. ISBN-10 1439814406

Abstracts

Swanson KR, Chakraborty G, **Rockne R**, Wang C, Peacock DL, Muzi M, Alvord EC Jr., Krohn K, Spence AM. A Mathematical Model for Glioma Growth and Invasion Links Biological Aggressiveness Assessed by MRI with Hypoxia Assessed by FMISO-PET. 53rd Annual Meeting of the Society for Nuclear Medicine (Platform Presentation), June 2007 - J Nucl Med. 2007; 48 (Supplement 2):151P

Swanson KR, **Rockne R**, Rockhill JK, Alvord EC Jr.: Mathematical modeling of radiotherapy in individual glioma patients: quantifying and predicting response to radiation therapy. AACR Annual Meeting. Los Angeles, CA, 2007

Swanson KR, **Rockne R**, Rockhill JK, Alvord EC Jr.: Combining mathematical modeling with serial MR imaging to quantify and predict response to radiation therapy in individual glioma patient. Annual Meeting of the Society for Neuro-Oncology. Dallas, TX, 2007

Rockne R, Swanson KR. Predicting efficacy of radiotherapy in individual glioma patients in vivo: a pilot study. European Society for Mathematical and Theoretical Biology Annual Meeting, Edinburgh, 2008

Rockne R, Moore JL, Swanson KR. Three-dimensional simulation of glioma growth and response to radiation therapy: a case study. Society for Mathematical Biology Annual Meeting, Toronto, Canada, 2008
G Chakraborty, S Gu, R Rockne, KR Swanson. Predicting metabolic growth patterns from patient-specific anatomic imaging and mathematical modeling of glioblastomas. International Conference on Mathematical Biology and Annual Meeting of the Society for Mathematical Biology, University of British Columbia, Vancouver July 2009.

Rockne R, Swanson KR. The role of delay and observation timing in assessing glioma response to radiation therapy. International Conference on Mathematical Biology and Annual Meeting of the Society for Mathematical Biology, University of British Columbia, Vancouver July 2009.

Chakraborty G, Gu S, **Rockne R**, Swanson KR. Predicting metabolic growth patterns from patient-specific anatomic imaging and mathematical modeling of glioblastomas. International Conference on Mathematical Biology and Annual Meeting of the Society for Mathematical Biology, University of British Columbia, Vancouver July 2009.

Gu S, Chakraborty G, **Rockne R**, Swanson KR. Spatiotemporal Pharmacokinetic/Pharmacodynamic Radioactive Tracer and Brain Tumor Modeling: A Method for Generating Patient-specific Simulated PET Images. International Conference on Mathematical Biology and Annual Meeting of the Society for Mathematical Biology, University of British Columbia, Vancouver July 2009.

Boone A, **Rockne R**, Mrugala MM, Rockhill JK, Alvord EC Jr, Swanson KR. The Clinical Significance of Mathematical Models in the Treatment and Management of Gliomas: A Case Study in Translating Applied Mathematics Research into Clinically Relevant Solutions. International Conference on Mathematical Biology and Annual Meeting of the Society for Mathematical Biology, University of British Columbia, Vancouver July 2009.

Szeto M, **Rockne R**, Swanson KR. Anatomic Variation in Quantitative Measures of Glioma Aggressiveness. International Conference on Mathematical Biology and Annual Meeting of the Society for Mathematical Biology, University of British Columbia, Vancouver July 2009.

Simon M, **Rockne R**, Swanson KR. A comparison between volumetric and localized spatial analysis techniques for assessing model parameters. International Conference on Mathematical Biology and Annual Meeting of the Society for Mathematical Biology, University of British Columbia, Vancouver July 2009.

Sodt R, **Rockne R**, Swanson KR, Kalet I. Simulation of Anisotropic Growth of Gliomas Using Diffusion Tensor Imaging. International Conference on Mathematical Biology and Annual Meeting of the Society for Mathematical Biology, University of British Columbia, Vancouver July 2009.

Swanson KR, Gu S, Chakraborty G, Champley K, Alessio A, Claridge J, **Rockne R**, Muzi M, Krohn K A, Spence A M, Alvord E C Jr., Anderson A R A, Kinahan P. In silico PET imaging: From anatomic glioma growth dynamics to metabolic tumor activity via bio-mathematical modeling. Annual meeting of the Society for Neuro-Oncology. Montreal, Quebec, Canada, 2010. Oxford University Press. *Neuron-Oncology* **12**(sup IV) 118
Boone A E, **Rockne R**, Mrugala M M, Swanson K R. Pre-treatment glioblastoma proliferation and invasion kinetics: A mechanism to predict pseudoprogression. Annual meeting of the Society for Neuro-Oncology. Montreal, Quebec, Canada, 2010. Oxford University Press. *Neuron-Oncology* **12**(sup IV) 118

Rockne R, Mrugala M M, Rockhill J K, Swanson K R. Predicting spatial patterns of tumor recurrence following radiation therapy: A hybrid clinical imaging and mathematical modeling approach. Annual meeting of the Society for Neuro-Oncology. Montreal, Quebec, Canada, 2010. Oxford University Press. *Neuron-Oncology* **12**(sup IV) 111

Holdsworth CH, Corwin D, Stewart R D, **Rockne R**, Swanson K R, Phillips M. Biologically optimized 4D dose distributions for the treatment of incurable glioblastoma. Annual meeting of the American Association of Physicists in Medicine. Vancouver British Columbia, Canada, 2011

Rockne R, Rockhill J K, Mrugala M M, Swanson K R. Patient-specific virtual radiation oncology: predicting and quantifying treatment response in individual glioblastoma patients. Annual meeting of the American Association of Physicists in Medicine. Vancouver British Columbia, Canada, 2011

Rockne R, Massey S, Mrugala M M, Anderson A R A, Swanson K R. Response to anti-angiogenic therapy in human brain tumors: the role of the microenvironment and heterogeneity. Casablanca International Workshop in Mathematical Biology: Analysis and Control. Casablanca, Morocco, 2011

Course Work

2011-2012 Academic year

AMATH 567 – Applied Analysis

AMATH 574 – Finite Volume Methods for Hyperbolic Problems

AMATH 535 – Mathematical Ecology

AMATH 700 – Independent Study - LeVeque

Current Research Funding

7/01/2009 **NIH R01 Grant** (Research Scientist – 50%)

- 6/30/2014 “Novel Tools for Evaluation and Prediction of Radiotherapy Response in Individual Glioma Patients”

PI: *K. R. Swanson*

9/01/2009 **NIH/NCI Physical Sciences Oncology Center (U54) Grant** (Research Scientist – 25%)

- 8/31/2014 “Integrative Mathematical Oncology”

PD: *R. Gatenby* (Moffitt Cancer Center), PI: *K. R. Swanson*

6/01/2011 **James F. McDonnell Foundation Collaborative Activity Award**

(Research Scientist – 25%)

- 5/31/2014 “BONK: Predicting and Controlling Glioma Recurrence: The Role of Heterogeneity and Microenvironment”

MPIs: *K. R. Swanson* , *P. Canoll* (Columbia), *A. Anderson* (Moffitt)